



Jet Propulsion Laboratory
California Institute of Technology

Visible / Shortwave Infrared Imaging Spectroscopy at JPL: Instruments and Algorithms

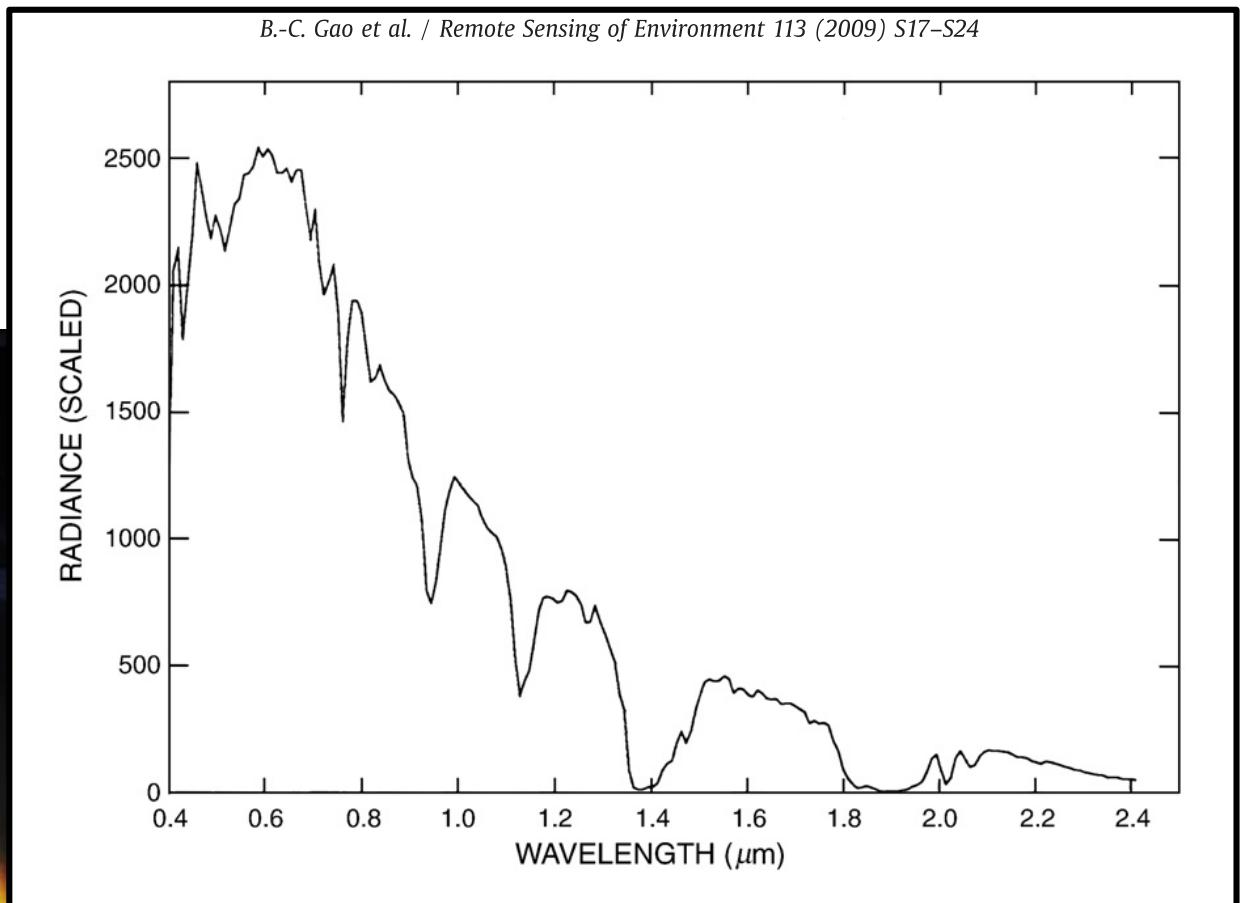
David R. Thompson, Robert O. Green, Michael Eastwood,
and the AVIRIS team

Jet Propulsion Laboratory, California Institute of Technology

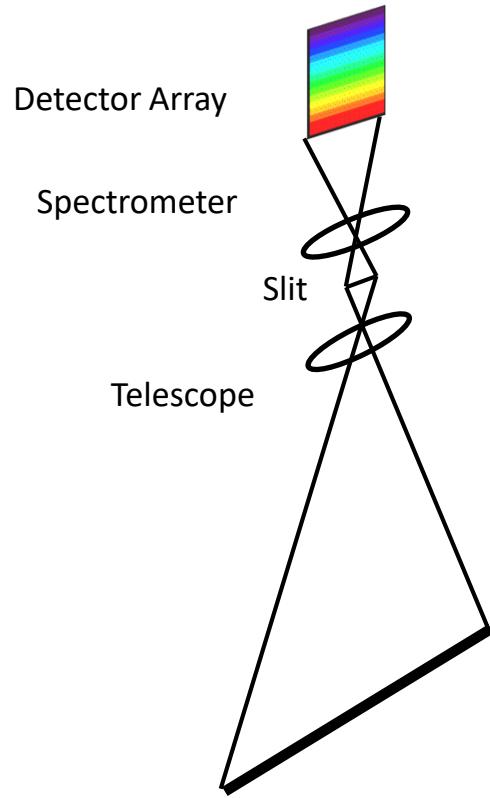
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US Government Support Acknowledged.

A Typical Radiance Spectrum

Typical units are
 $\text{W m}^{-2} \text{sr}^{-1} \text{nm}^{-1}$



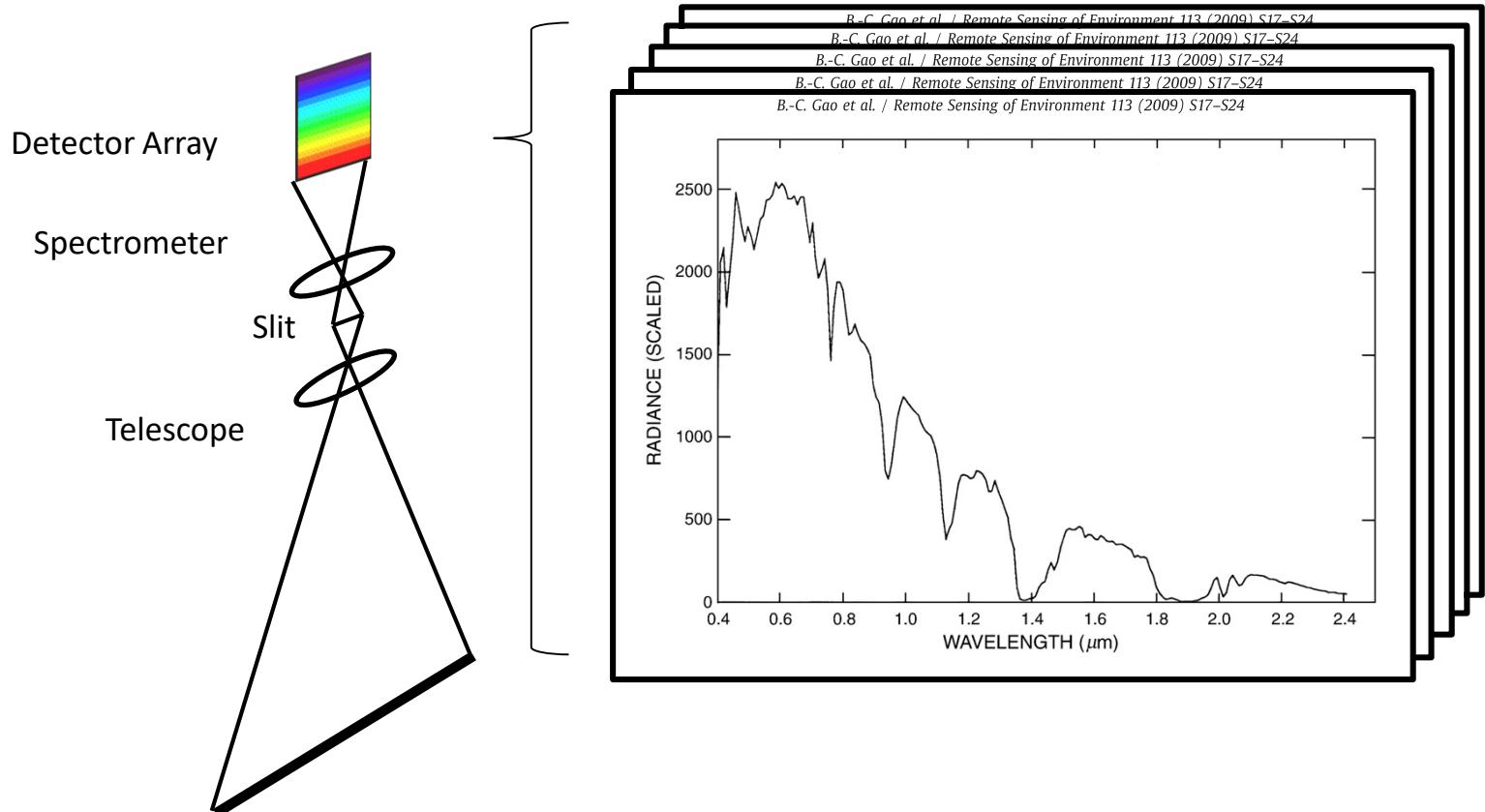
Imaging spectroscopy – 100s of parallel spectrometers



2/12/2020

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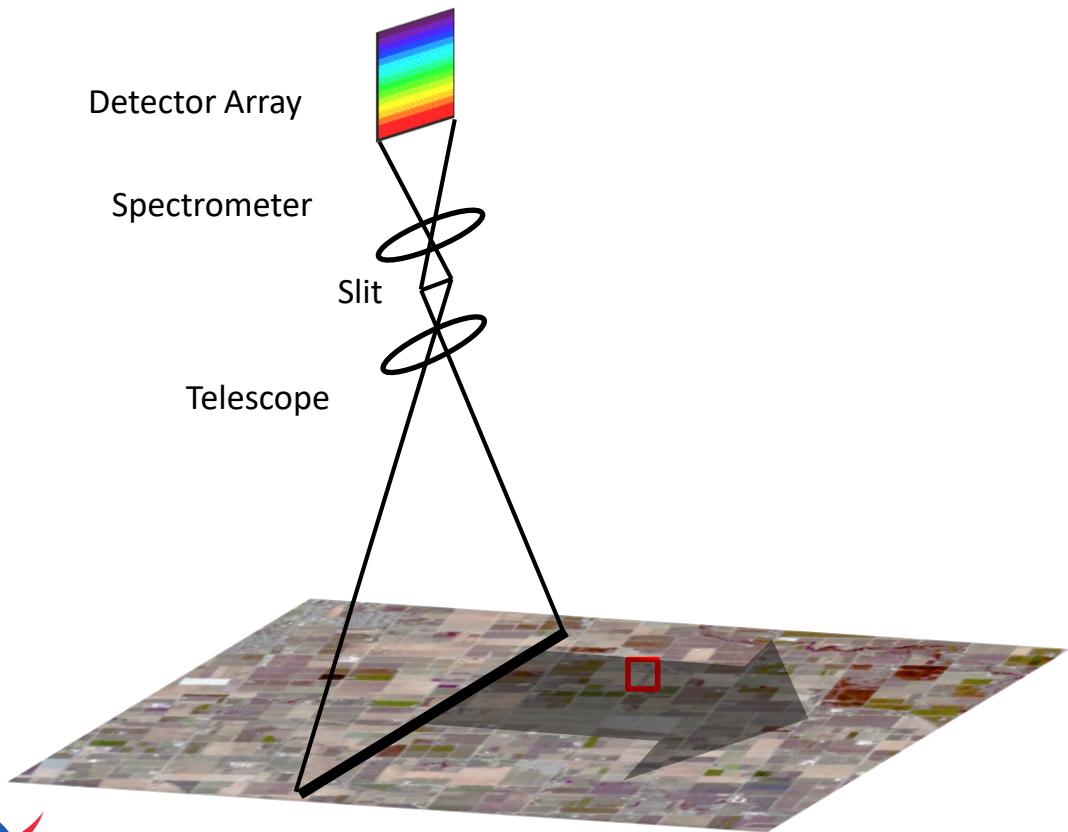
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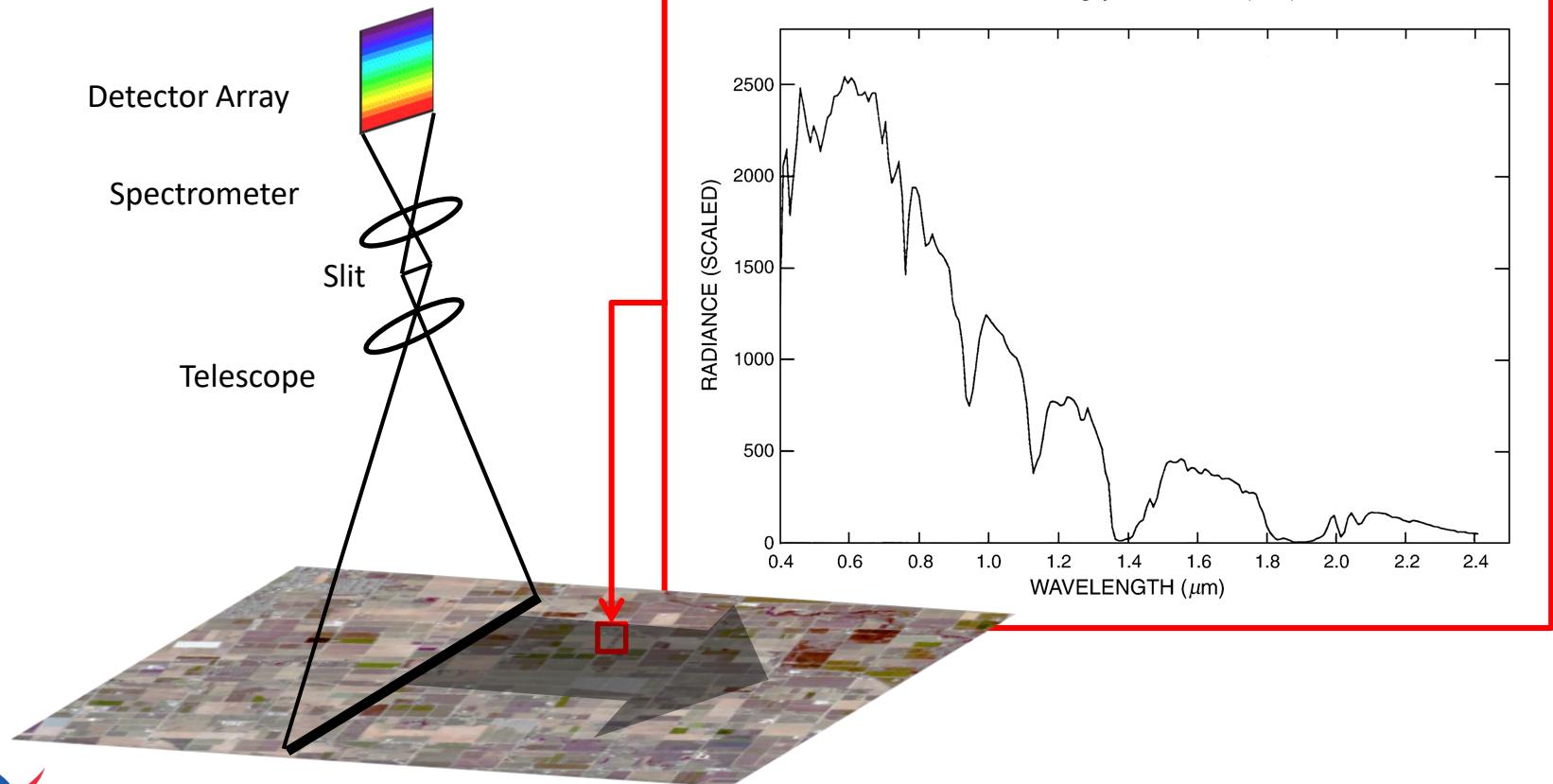
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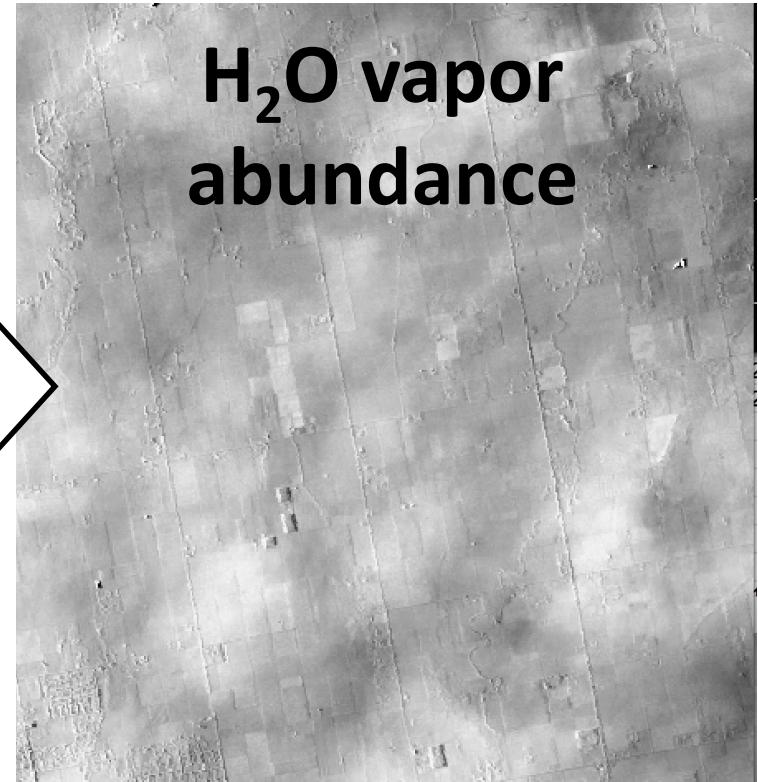
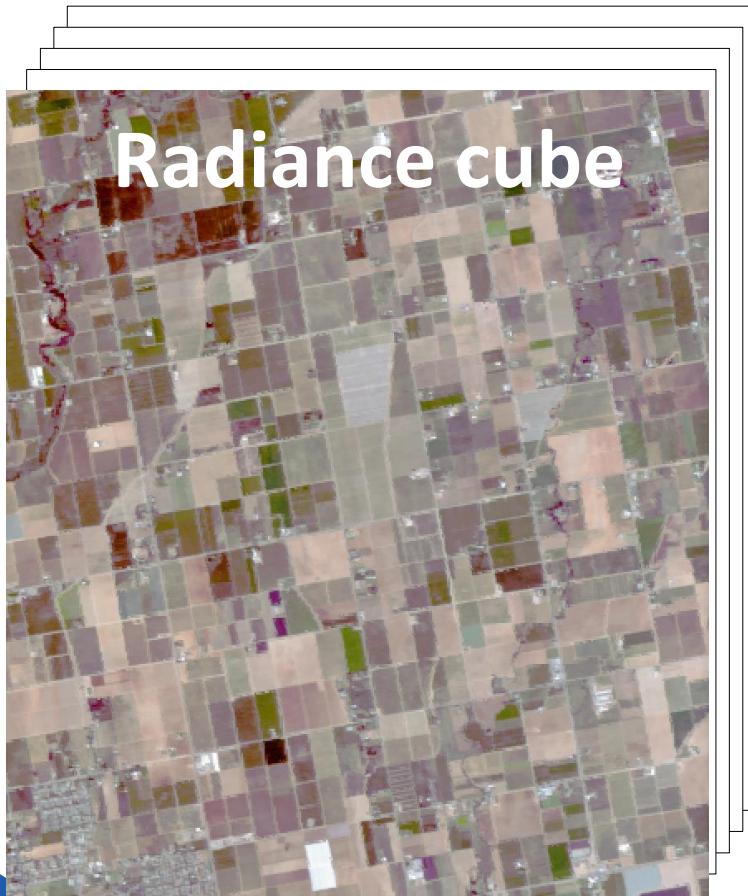
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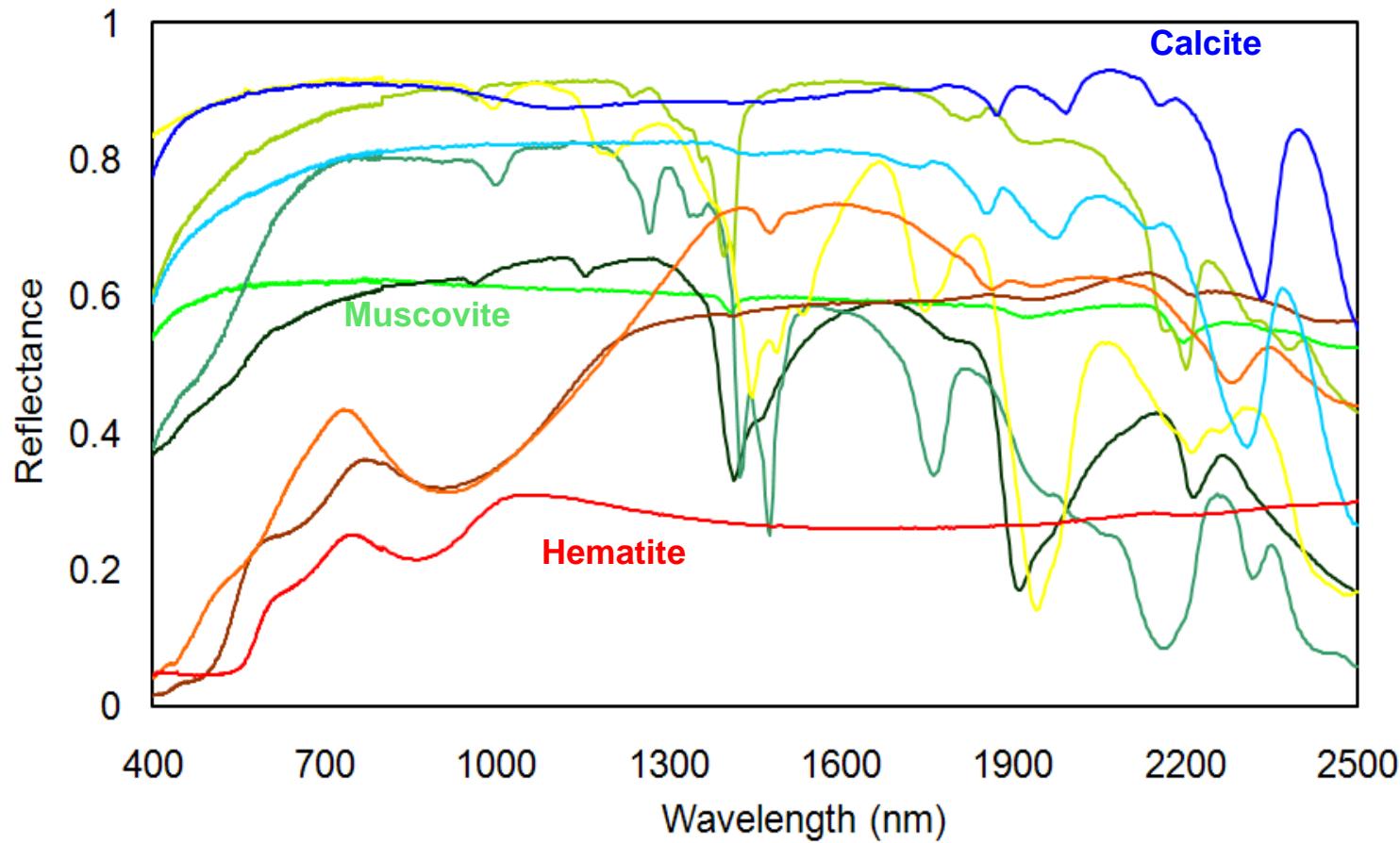
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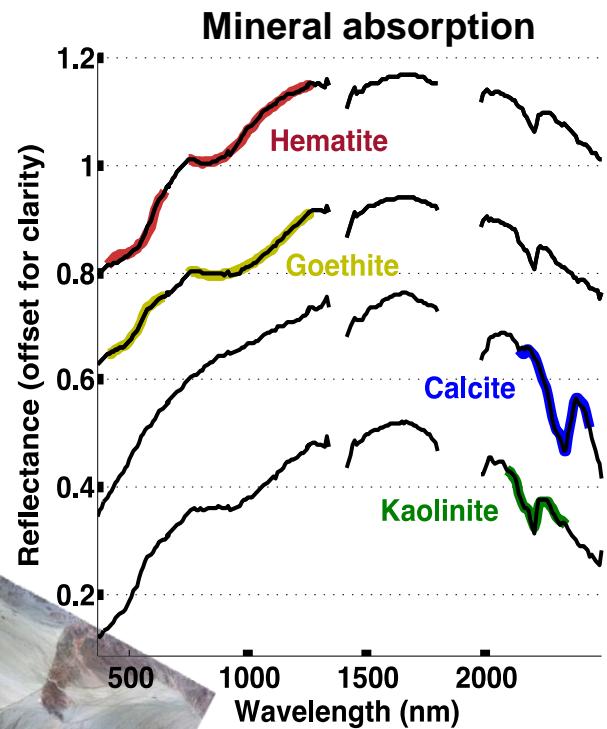
Reflectance enables quantitative measurement of surface properties



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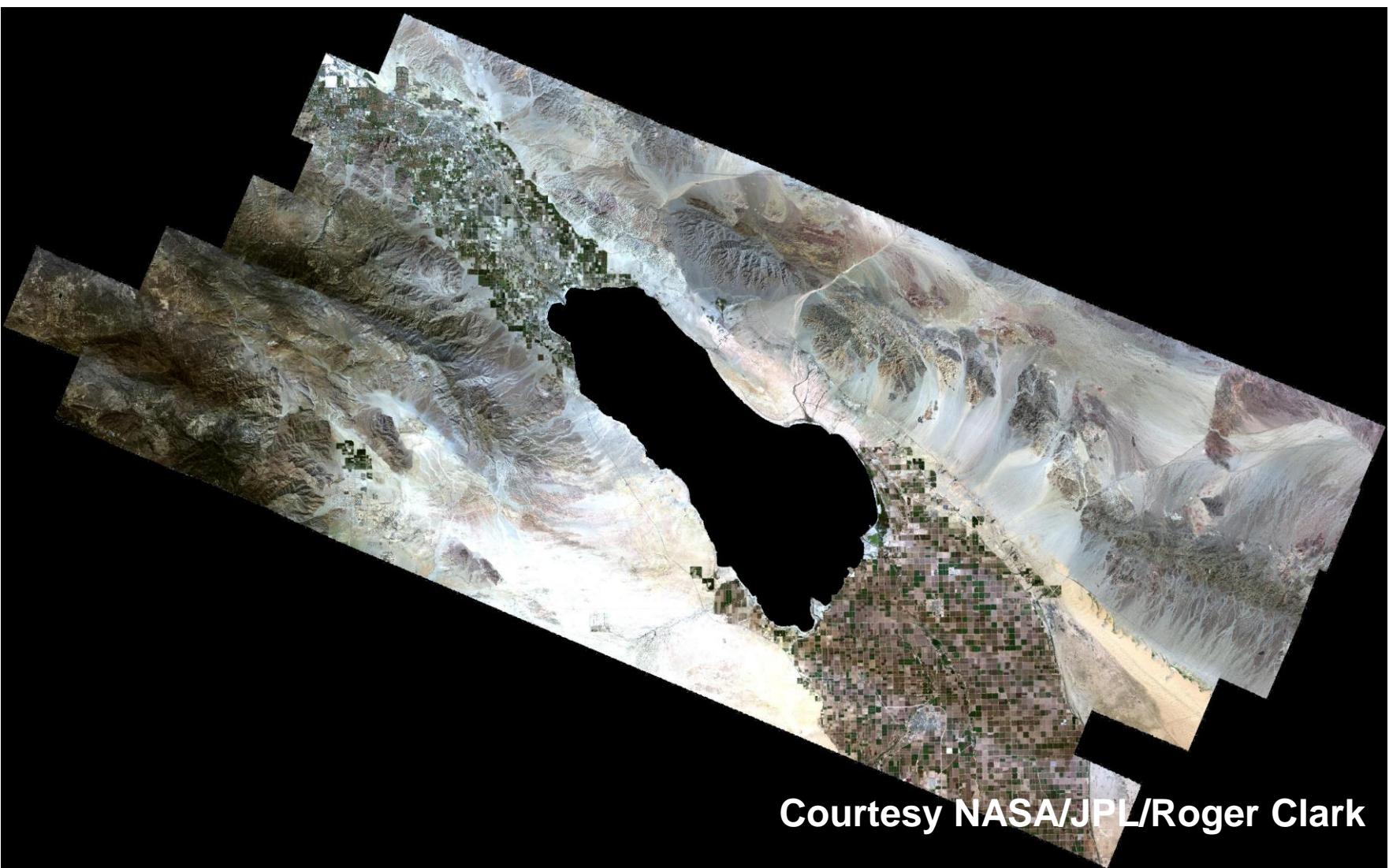
davidraythompson@gmail.com

Continuum-interpolated absorption fits



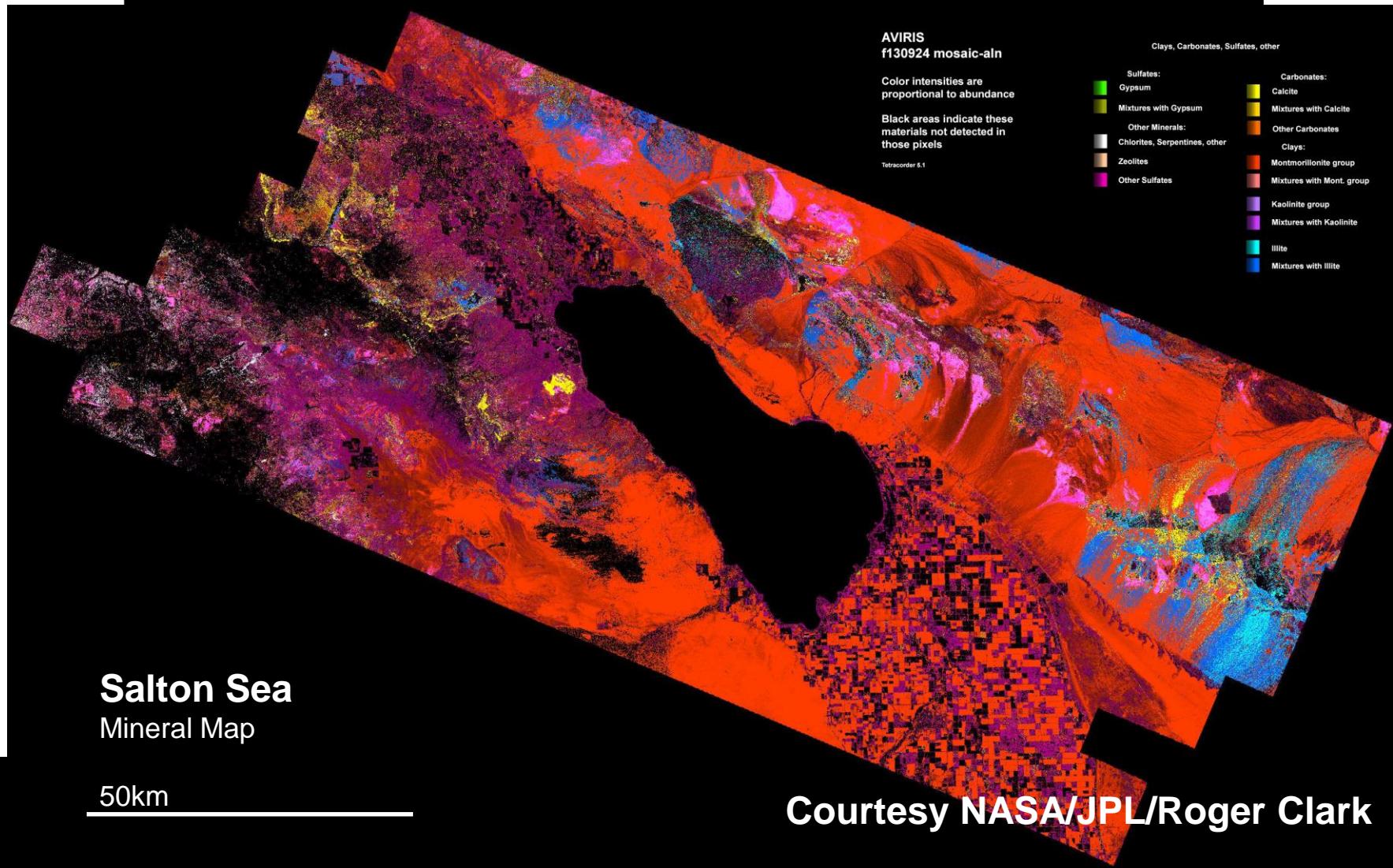
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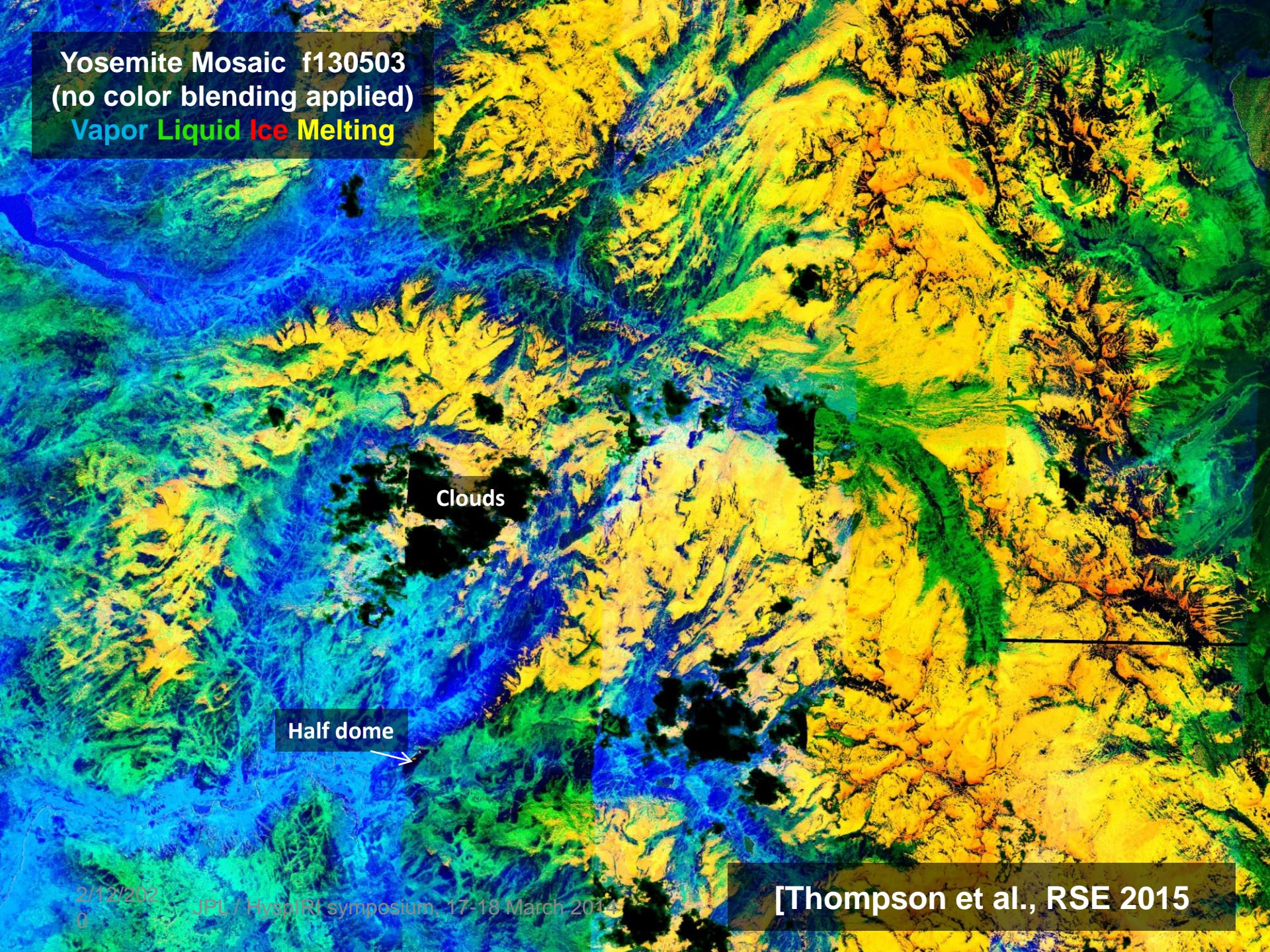


Courtesy NASA/JPL/Roger Clark

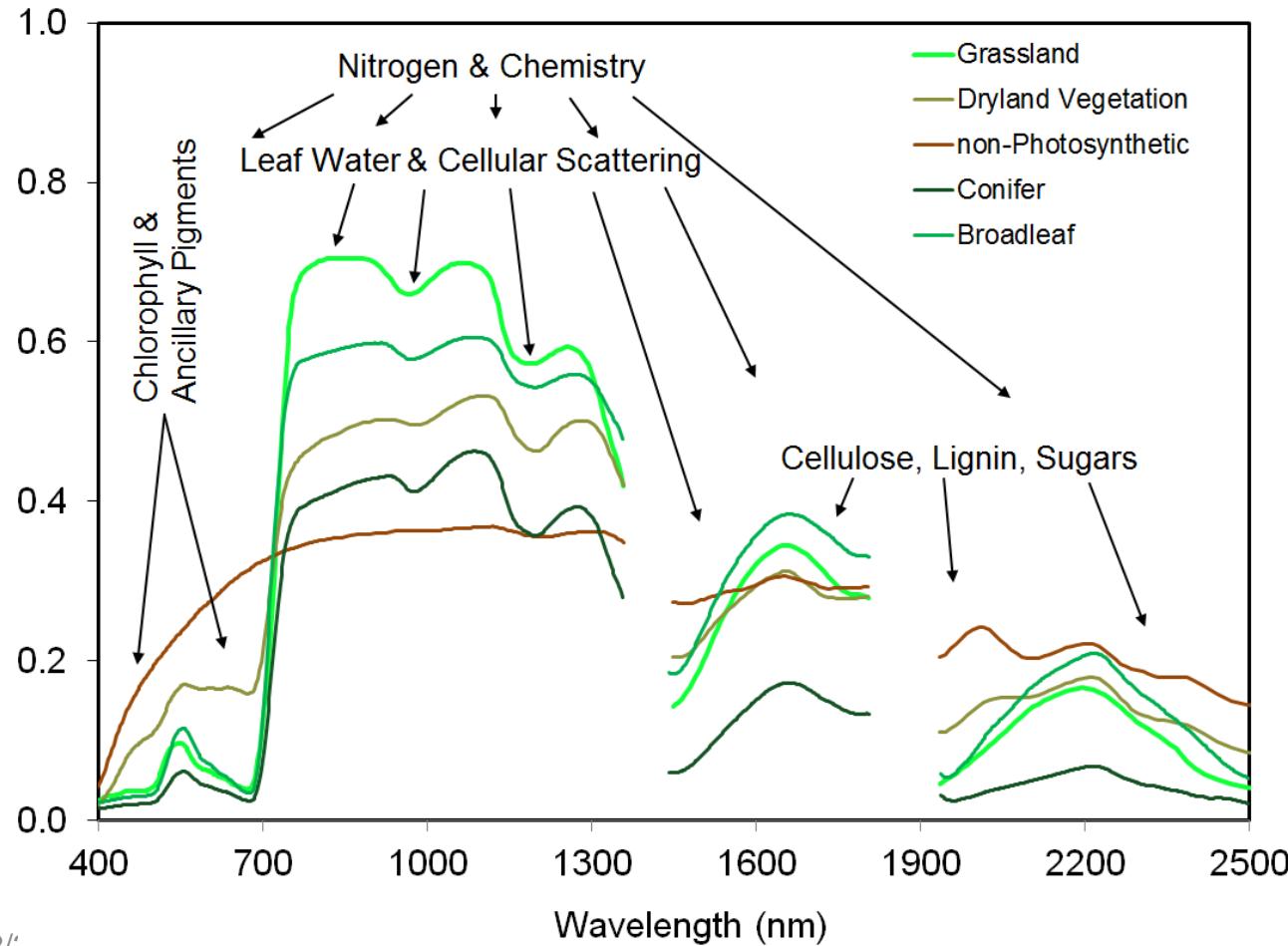
Salton Sea, CA (AVIRIS instrument)



**Yosemite Mosaic f130503
(no color blending applied)
Vapor Liquid Ice Melting**



Vegetation absorption features



Earth Science Applications

- Map terrestrial ecosystem composition and health
- Characterize and map aquatic ecosystems such as coral reefs, phytoplankton
- Geologic maps
- Find and quantify greenhouse point sources
- Urban studies
- Agriculture
- Cryosphere, water quality and resource studies



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Information Science Collaborations

Next-generation remote sensing algorithms
bridging physically-based models with
learned components

Bayesian statistical treatments for rigorous
end-to-end uncertainty propagation

Synergy with radar and other sensing
modalities

Scaling to the future HyspIRI mission



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